

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application.

**LISTING OF CLAIMS**

Cancel Claims 1-18.

19. (New) A method for organizing and storing data comprising the steps of:  
receiving a block of data from a data source at a first data storage site;  
maintaining addressing information in a tree data structure for said block of data;  
determining a storage device address to store said block of data;  
determining a logical block address within said storage device address to store  
said block of data;  
determining said tree data structure for said block of data;  
determining a depth in said tree data structure of said storage device address;  
in response to said storage device address not existing in said tree data structure,  
creating said storage device address in said tree data structure;  
in response to said logical block address existing in said tree data structure,  
overwriting an existing block of data with said block of data at said logical address;  
in response to said logical block address not existing in said tree data structure,  
storing said block of data at said logical block address;  
in response to said depth in said tree data structure of said storage device address  
being greater than a depth threshold, K, adjusting said depth in said tree data structure of  
said storage device address to be less than said depth threshold, K;  
in response to said block of data not being a final block of data of a group of data,  
returning to the step of receiving a block of data; and  
transferring said group of data to a second data storage site.

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**20. (New)** The method of **Claim 19**, comprising the additional steps of:  
determining a number of active input ports receiving data from said data source;  
and  
setting said depth threshold, K to depend upon said number of active input ports.

**21. (New)** The method of **Claim 19**, comprising the additional steps of:  
determining a number of active input ports receiving data from said data source;  
and  
setting said depth threshold, K equal to  $\log_2 (P)$ , where  $P$  = said number of active input ports.

**22. (New)** The method of **Claim 19**, wherein the step of adjusting said depth in said tree data structure further comprises the step of:  
adjusting said depth in said tree data structure of said storage device address to be equal to zero.

**23. (New)** An article of manufacture comprising a data storage medium tangibly embodying a program of machine-readable instructions executable by a digital processing apparatus to perform method steps for organizing and storing data comprising the steps of:  
receiving a block of data from a data source at a first data storage site;  
maintaining addressing information in a tree data structure for said block of data;  
determining a storage device address to store said block of data;  
determining a logical block address within said storage device address to store said block of data;  
determining said tree data structure for said block of data;  
determining a depth in said tree data structure of said storage device address;  
in response to said storage device address not existing in said tree data structure, creating said storage device address in said tree data structure;

in response to said logical block address existing in said tree data structure, overwriting an existing block of data with said block of data at said logical address;

in response to said logical block address not existing in said tree data structure, storing said block of data at said logical block address;

in response to said depth in said tree data structure of said storage device address being greater than a depth threshold, K, adjusting said depth in said tree data structure of said storage device address to be less than said depth threshold, K;

in response to said block of data not being a final block of data of a group of data, returning to the step of receiving a block of data; and

transferring said group of data to a second data storage site.

**24. (New)** The article of manufacture of **Claim 23**, comprising the additional steps of:  
determining a number of active input ports receiving data from said data source;  
and  
setting said depth threshold, K to depend upon said number of active input ports.

**25. (New)** The article of manufacture of **Claim 23**, comprising the additional steps of:  
determining a number of active input ports receiving data from said data source;  
and  
setting said depth threshold, K equal to  $\log_2 (P)$ , where P = said number of active input ports.

**26. (New)** The article of manufacture of **Claim 23**, wherein the step of adjusting said depth in said tree data structure further comprises the step of:  
adjusting said depth in said tree data structure of said storage device address to be equal to zero.

27. (New) A data storage system comprising:

a primary backup appliance located at a first data storage site;

a second data storage site;

one or more communication lines for communication between said first data storage site and said second data storage site;

wherein said primary backup appliance is programmed to perform method steps for organizing and storing data, comprising the steps of:

receiving a block of data from a data source at a first data storage site;

maintaining addressing information in a tree data structure for said block of data;

determining a storage device address to store said block of data;

determining a logical block address within said storage device address to store said block of data;

determining said tree data structure for said block of data;

determining a depth in said tree data structure of said storage device address;

in response to said storage device address not existing in said tree data structure, creating said storage device address in said tree data structure;

in response to said logical block address existing in said tree data structure, overwriting an existing block of data with said block of data at said logical address;

in response to said logical block address not existing in said tree data structure, storing said block of data at said logical block address;

in response to said depth in said tree data structure of said storage device address being greater than a depth threshold, K, adjusting said depth in said tree data structure of said storage device address to be less than said depth threshold, K;

in response to said block of data not being a final block of data of a group of data, returning to the step of receiving a block of data; and

transferring said group of data to a second data storage site.

**28. (New)** The system of Claim 27, comprising the additional steps of:  
determining a number of active input ports receiving data from said data source;  
and

setting said depth threshold, K to depend upon said number of active input ports.

**29. (New)** The system of Claim 27, comprising the additional steps of:  
determining a number of active input ports receiving data from said data source;  
and  
setting said depth threshold, K equal to  $\log_2 (P)$ , where  $P$  = said number of active input ports.

**30. (New)** The system of Claim 27, wherein the step of adjusting said depth in said tree data structure further comprises the step of:

adjusting said depth in said tree data structure of said storage device address to be equal to zero.

**31. (New)** A method for organizing and storing data comprising the steps of:  
receiving a block of data from a data source at a first data storage site;  
maintaining addressing information in a tree data structure for said block of data;  
determining a storage device address to store said block of data;  
determining a logical block address within said storage device address to store said block of data;  
in response to said logical block address existing in said tree data structure,  
overwriting an existing block of data with said block of data at said logical address;  
in response to said block of data not being a final block of data of a group of data,  
returning to the step of receiving a block of data; and  
transferring the final block for each specific address of said group of data to a second data storage site, in accordance with said tree data structure to allow storing said blocks to actual addresses at said second data storage site.

**32. (New)** The method of Claim 31, wherein said group of data is a consistent transaction set.

**33. (New)** An article of manufacture comprising a data storage medium tangibly embodying a program of machine-readable instructions executable by a digital processing apparatus to perform method steps for organizing and storing data comprising the steps of:

receiving a block of data from a data source at a first data storage site;  
maintaining addressing information in a tree data structure for said block of data;  
determining a storage device address to store said block of data;  
determining a logical block address within said storage device address to store said block of data;

in response to said logical block address existing in said tree data structure,  
overwriting an existing block of data with said block of data at said logical address;  
in response to said block of data not being a final block of data of a group of data,  
returning to the step of receiving a block of data; and

transferring the final block for each specific address of said group of data to a second data storage site, in accordance with said tree data structure to allow storing said blocks to actual addresses at said second data storage site.

**34. (New)** The article of manufacture of Claim 33, wherein said group of data is a consistent transaction set.

**35. (New)** A data storage system comprising:

a primary backup appliance located at a first data storage site;  
a second data storage site;  
one or more communication lines for communication between said first data storage site and said second data storage site;  
wherein said primary backup appliance is programmed to perform method steps for organizing and storing data, comprising the steps of:

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receiving a block of data from a data source at a first data storage site;  
maintaining addressing information in a tree data structure for said block of data;  
determining a storage device address to store said block of data;  
determining a logical block address within said storage device address to store  
said block of data;

in response to said logical block address existing in said tree data structure,  
overwriting an existing block of data with said block of data at said logical address;

in response to said block of data not being a final block of data of a group of data,  
returning to the step of receiving a block of data; and

transferring the final block for each specific address of said group of data to a  
second data storage site, in accordance with said tree data structure to allow storing said  
blocks to actual addresses at said second data storage site.

**36. (New)** The system of **Claim 34**, wherein said group of data is a consistent  
transaction set.